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THE

Journal of the Society of Arts,

AND OF

THE INSTITUTIONS IN UNION.

110TH SESSION.] FRIDAY, FEBRUARY 5, 1864. [No. 585. VOL. XII.

Announcements by the Council.

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ORDINARY MEETINGS.

Wednesday Evenings, at 8 o'clock.

FEB. 10.—"On Fresco Painting, as a suitable mode of Mural Decoration." By J. BEAVINGTON ATKINSON, Esq.

FEB. 17.—"On Public and Private Dietaries," a sequel to the paper read on the 16th December last. By Dr. EDWARD SMITH, F.R.S.

FEB. 24.—"On Petroleum, its Economic Value, with a Visit to the Petroleum Wells of Canada." By DR. MARCET, F.R.S.

CANTOR LECTURES.

Courses of Lectures on the following subjects are arranged for the present Session :—

The Operation of the Present Laws of Naval Warfare on International Commerce. By G. W. HASTINGS, Esq., Barrister-at-Law (already delivered).

Fine Arts Applied to Industry. By W. BURGES, Esq.

Chemistry Applied to the Arts. By Dr. F. CRACE CALVERT, F.R.S.

The following is a syllabus of Mr. Burges's Lectures, of which the first will be delivered on Monday next, the 8th inst. :—

FEB. 8.—LECTURE I. INTRODUCTORY :—What is an art manufacture? Advancing state of English manufactures in an art point of view. Much owing to Government Schools of Art. Impediments to further progress:—1. Want of a distinctive architecture in the 19th century fatal to art generally. 2. Want of a good costume fatal to colour. 3. Want of sufficient teaching of the figure fatal to art in detail.—Hints for the advancement of Art applied to Industry.—Design of following lectures:—1. To take one or two phases of some particular industry in past times. 2. To compare them with our own phase of the same industry. 3. To offer suggestions for our future improvement.

FEB. 15.—LECTURE II.—*Glass.*—Antique glass, Venetian glass, modern glass (Powell, Chance, &c.); Mediæval stained glass; modern ditto; Mediæval enamels; modern ditto; (Legoste of Paris.)

FEB. 22.—LECTURE III.—*Pottery.*—Etruscan vases (Wedgwood); Italian majolica (Minton); Sèvres china; modern biscuit.

FEB. 29.—LECTURE IV.—*Iron and Brass.*—Antique bronzes; Mediæval ditto; modern French bronzes (Barbédienne); Mediæval dinanderie; modern ditto (Hardman, Hart, &c.); Mediæval and Renaissance wrought iron; modern ditto; cast iron.

MAR. 7.—LECTURE V.—*Gold and Silver.*—Antique and Mediæval plate; modern ditto (Elkington); Antique and Mediæval jewellery; modern ditto; Antique and Mediæval coinage; modern ditto.

MAR. 14.—LECTURE VI.—*Furniture.*—Mediæval furniture, oak and painted; Renaissance; 16th and 17th centuries; modern.

MAR. 21.—LECTURE VII.—The Weaver's art; Mediæval, Eastern, modern.

The Lectures will begin on each evening at 8 o'clock.

INSTITUTIONS.

The following Institutions have been taken into Union :—

Ashton and Dukinfield Mechanics' Institution.
Hoddesdon and Broxbourne Mutual Improvement Society.

The Christmas subscriptions are now due, and should be forwarded by cheque or post-office order, made payable to the Financial Officer, Samuel Thomas Davenport. All cheques and post-office orders should be crossed through Messrs. Coutts and Co.

Proceedings of the Society.

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CANTOR LECTURES.

THE OPERATION OF THE PRESENT LAWS OF NAVAL WARFARE ON INTERNATIONAL COMMERCE. By G. W. HASTINGS, ESQ.

THIRD LECTURE, MONDAY, JANUARY 25TH.—THE LAW OF CONTRABAND, AND OF CAPTURE OF PRIVATE PROPERTY AT SEA.

Mr. HASTINGS, in commencing his third lecture, observed that in this course he touched but slightly on maritime law as between belligerents, inasmuch as he treated of the subject chiefly in connection with commerce, and belligerents, of course, had no trade with each other; he spoke of it principally as affecting neutrals. The lectures, too, were designed to illustrate principles, not to enter into the details and technicalities of the law. Now, one great principle involved in the subject was this, that the natural right of neutrals to trade was not in any way abolished by war; they had an undiminished right to trade with both belligerents; but they exercised that right subject to certain restrictions and inconveniencies which each belligerent might inflict under the sanction of international law. The belligerent power of blockade was one of these restrictions, and the law of contraband was another. International law recognised a right in any state that might be at war to prevent the supply to its antagonist of those articles which would enable him the better to continue the contest. In the origin of the law it became customary for a sovereign declaring war to publish a list of the articles which he forbade to be sent to the enemy's country; and hence the term *contraband*, which means simply against the *ban*, or edict, thus published. It was to be observed that whereas blockade attached only to particular ports and specified lines of coast, the prohibition of all trade in contraband articles extended to all parts of the enemy's territory, whether blockaded or not; it was sufficient if the port of destination were hostile. It was also to be remembered that the character of contraband only attached when the goods were in transit to the belligerent; up to the moment of their shipment the trade in them was perfectly free; after that it was carried on at the risk of the trader. Mr. Hastings sketched the history of the law of contraband, from its origin (as far as England was concerned) in the reign of Elizabeth, and showed that the lists published in former times of contraband articles embraced a wider range than at present, the tendency of modern times being to diminish the restrictions on trade. English jurists, to the further relief of commerce, held that contraband was of two classes—absolute and conditional; the first being those articles which would be used in war only, such as guns, shot, powder, &c.; the second, those which might be used either for war or peace. The character of the latter was determined by the circumstances of the case; provisions, for instance, were *prima facie* pacific, but, if shipped for a besieged place, became contraband. The French writers, especially Hautefeuille, were inclined to restrict contraband to the actual munitions of war. The punishment inflicted by the belligerent on the neutral carrying contraband, was the forfeiture of the prohibited cargo, to which was added the loss of the ship if it belonged to the same owner, or if deception had been practised as to the voyage. The mode of applying the law was by the right of search, with which every belligerent power was armed, and which extended to vessels under every flag. Mr. Hastings observed that this brought him naturally to the second subject of his lecture, that of the capture of private property at sea. There were four predicaments in which a belligerent exercising the right of search might find merchantmen at sea—they might be:—1. Enemy's ship with enemy's cargo; 2. Neutral ship with neutral cargo; 3. Enemy's ship with neutral cargo; 4. Neutral ship with enemy's cargo. As to the first, it was clear they were fair prize under the present law as recognised by every nation. As to the second, it was equally clear they were free. On the third and fourth, the policy of France and England, up to 1856, had been different. France held the rule of "Enemy's ship, enemy's cargo;" *i.e.*, that a neutral cargo on board an enemy's ship was confiscable, as tainted with the character of the ship. England, on the contrary, considered the neutral cargo as free. On the other hand, the English rule condemned as good prize the enemy's cargo found in a neutral ship, while France, America, and generally the continental states, had struggled for the rule, "free ship, free goods," or that the neutral flag should cover the enemy's cargo. England held her own on this point against the two maritime confederations of 1780 and 1801, but abandoned the rule in 1856, when Lord Clarendon signed the Declaration of Paris; France, on her part, waiving her policy of "enemy's ship, enemy's goods." Both rules had been previously suspended during the war with Russia. England gained by this concession the abolition of privateering, but it became a question whether, under the present law, our mercantile flag would not vanish from the seas in the event of a naval war, as our traders would probably prefer to ship their goods in safety under a neutral flag. Mr. Hastings concluded with some observations on the evils of privateering.

Fourth Lecture, Monday, February 1st.—The Foreign Enlistment Act.

Mr. Hastings, after observing on the difficulty involved in dealing with subjects which formed current topics for public discussion, and concerning which partisan feeling was excited, and the peculiar application of this remark to the matter of his concluding lecture, went on to describe the provisions of the Foreign Enlistment Act, 59 Geo. III., cap. 69. It was, as the preamble showed, a municipal law, passed to preserve the peace and welfare of this kingdom; and while the first portion referred to the enlistment of foreign troops, the latter forbade the equipping and fitting-out of ships for the service of foreign powers without license from the Crown; but, though a municipal act, it dealt with international matters. Municipal law was not unfrequently compelled to interfere in order to carry out international obligations; as, for instance, in the statutes enforcing the extradition treaties. Above all, when the action of individual subjects threatened to clash with or subvert the policy of the corporate state, the legislator was bound to compel individuals to shape their conduct by the rule laid down, or obligation entered into, by the whole nation. The grand object of international law being to maintain peace and intercourse between states, it followed that any conduct tending to compromise peace, such as fitting out expeditions on neutral territory to assist a belligerent, or making such territory the starting-point for hostilities, must be rigidly prohibited by any government wishing to maintain the sanctity of public law. The operation of such a law as this Foreign Enlistment Act was wholly different from that of contraband. The law of contraband left trade free, but told the trader that he embarked on the forbidden traffic at his own peril, and without the protection of his flag; this act absolutely *prohibited* the conduct against which it was aimed,—a vital distinction. Mr. Hastings traced the history of the enactment, showing that it was borrowed from the American statute of 1794, passed at the instance of Washington, to prevent the equipment of French privateers in American ports, and brought before Parliament by Mr. Canning, when England found herself a neutral power in the war waged by Spain against her revolted colonies. The American Act had been honourably administered, and a number of cases had been decided upon it by the Courts of the United States; the last instance of its operation being in our favour during the Russian war. Mr. Hastings alluded to the escape of the *Alabama*, and the cases of the *Alexandra*, *Rappahannock*, and the steam rams. However lamentable the mischance respecting the *Alabama*, he thought too much blame had been cast on the English Government. A state, like an individual, could but do its best, and was blameless in that event whatever might occur; and history showed that such mischances were not confined to this country, since the American Act had also been evaded, as the records of American tribunals would show. Mr. Hastings concluded with a brief summary of the priciples he had endeavoured to elucidate in the course. He was aware how much his exposition of them had fallen short of their importance and interest, but he trusted, nevertheless, it had not been wholly unworthy of the objects of the foundation, or the dignity of the Society.

The Chairman (Mr. W. Hawes) said, before the meeting separated he desired to express the thanks of the Council and of the Society to Mr. Hastings, for the very able and very interesting course of lectures he had just concluded. He had also to express regret that they had not been more numerously attended, and that the very valuable information which had been brought before the members had not received that attention which the Council expected would have been given at the present time to so interesting a subject. Still, as this was the first time the Society had given its members an opportunity of receiving instruction by means of lectures delivered by gentlemen distinguished for their knowledge in those branches of science to which these lectures had been devoted, the Council could not but hope that when their value was more universally known and appreciated, the attendance would be commensurate with the importance of these lectures, and the ability with which they had been delivered.

Eighth Ordinary Meeting.

Wednesday, February 3rd, 1864; Lord Henry G. Lennox, M.P., Vice-President of the Society, in the chair.

The following candidates were proposed for election as members of the Society:—

Bevan, Alfred, 11, Bryanston-square, W.
Bird, Thomas, 106, King-street, Manchester.
Busk, William, 28, Bessborough-gardens, Pimlico, S.W.
Greig, Robert R., 4, Verulam-buildings, Gray's-inn, W.C.
Henchy, Capt. Robert Cameron, Junior United Service Club, S.W.
Nunn, Richard M., Grays, Essex.

The following candidates were balloted for and duly elected members of the Society:—

Appleby, T. H., 30, Gracechurch-street, E.C.
Ashton, Thomas, J.P., Portland-street, Manchester.
Bartley, George C. T., South Kensington Museum, S.W.
Beauclerc, Capt. George, 23a, Grosvenor-street West, W.
Bickford, J. J., Tuckingmill, Cornwall.
Butler, James Robert, 4, Elm-street, Gray's-inn-road, W.C.
Cargill, William Walter, M.P., 4, Connaught-place West, W.
Cole, Alan Summerly, South Kensington Museum, S.W.
Cole, Lieut. Henry Hardy, R.E., Brompton Barracks, Chatham.
Corbould, Edward Henry, 10, Hyde-park-gate South, W.
Cross, William S., Park-street, Richmond, S.W.
Davies, John, 166, Queen-street, Portsea.
Del Rio, Patricio M., 130, Jermyn-street, St. James's, S.W.
Edwards, Rev. Allen T., M.A., 5, Kennington-terrace, S.
Fisher, George, The Woodlands, near Cardiff.
FitzGerald, Lord Otho, 8, Carlton-house-terrace, S.W.
Howell, George, 693, Old Kent-road, S.E.
Lawrence, Hugh M., Atlas Works, Manchester.
Lloyd, James Richard, Shrubbery, Belmont-hill, Lee, S.E.
Mackinlay, D., 42, Clarges-street, Piccadilly, W.
Martin, Louis Emile Constant, Chateau Boujeon, Rue Balzac, Paris; and 32, Albion-street, Hyde-park, W.
Masters, M., 1, Paragon-place, New Kent-road, S.E.
Moser, John, 165, High-street, Southwark, S.
Owen, Philip Cunliffe, South Kensington Museum, S.W.
Oxland, Robert, F.C.S., Empire City, Nevada Territory, America.
Rodgers, Rev. John, 17, Mecklenburgh-square, W.C.
Sale, Colonel Thomas Henry, 27, Westbourne-park, W.
Sturgeon, John, Pease's-buildings, Leeds.
Thicke, Charles James, 17 and 18, New Bridge-street, Blackfriars, E.C., and Rosendale, Dulwich, S.E.
Walker, Mowbray, Millwall Iron Works, E.
Wolff, Lewis, 15, Albert-square, Clapham, S.

The Paper read was—

ON A METHOD OF INSTANTANEOUS ENGRAVING ON METAL.

By Monsieur E. Vial, of Paris.

A great number of processes have been at various times proposed as substitutes both for engraving in relief upon wood and also as aids to plate engraving. The ordinary process of engraving upon wood, as well as the plate engraving, requires long and costly work; and both processes are merely reproductions of the drawings of artists, the difficult intepretation of whose ideas is a constant stumbling block to the engraver, whilst the final result obtained is always more or less a combination of the ideas of the artist and those of the engraver.

To engrave a drawing directly upon the plate without the intervention or (so to speak) the interpretation of the engraver, is, then, of unquestionable utility, both for the purposes of relief and intaglio engraving. In the numerous trials which have been made upon this subject in order to obtain the necessary depth in the engraving, recourse has almost always been had to acids, or to voltaic electricity, but it is evident that with this method of operating the metal is acted upon, at the same time, both in a lateral and a vertical direction, and hence the result has been more or less imperfect and unsatisfactory.

The new processes which I have the honour to submit to the Society of Arts this evening are based (excepting the first) upon electro-chemical phenomena, without the aid of an ordinary galvanic battery, the effect of which is a clean, deep, and non-lateral biting. They have been protected by letters patent in this country and in France, and form the subject of a paper which I presented on the 15th of March, 1863, to the Imperial Institute of France, a commission appointed by which has reported favourably on my communication and conveyed to me the thanks of the Institute for it.

I will now briefly describe the fundamental principles of my processes, together with the different manipulations and the industrial applications which result therefrom.

I may state firstly, that the principle of my discovery is but the application of a scientific fact long since known, which is, that if we plunge a piece of one kind of metal (say steel, for instance) into a saline solution of a metal of an opposite nature (such as copper), the solution is immediately decomposed, and the metal reduced is precipitated upon the former, frequently with a considerable amount of adhesion. Such is my starting point, and without taking upon myself the scientific explanation of the phenomena, I shall confine myself merely to the description thereof.

The first process which I shall describe depends—

1st. Upon metallic precipitations.

2nd. Upon the relative affinity of acids for different metals.

It consists, firstly, of making a drawing upon paper with a metallic ink, composed, for example, of a solution of sulphate of copper; and I may add, *en passant*, that a solution of the salt of any other metal, such as lead, bismuth, mercury, silver, &c., would produce the same effect, according to the metal desired to be engraved. When the drawing has been thus made it is placed, face downwards, upon a plate of zinc or steel, and next covered at the back with a piece of cloth slightly damped, and the whole is then submitted to a uniform pressure. About two minutes afterwards the design will be found transferred entirely, and with the greatest faithfulness, on to the metal plate, without any alteration or deterioration whatever of the original drawing. If instead of making the drawing upon paper, it is made more simply still, upon the metal itself (whether zinc or steel), with this metallic ink, the same phenomena are produced. In this state, in either the one case or the other, the design appears on the surface of the plate in slight relief formed by the deposit of copper, a solid and resisting body.

But in order to obtain a sufficient degree of relief for printing purposes, and more especially for surface printing, it is necessary to employ corrosion by acids or voltaic electricity, and this constitutes the second phase of the process. In fact the acids, having a less degree of affinity for the copper than for the zinc, immediately attack the latter, whilst the former serves as a kind of protecting varnish to the lines.

I regard this process more from a scientific than an industrial point of view, for, having been very much occupied with carrying out my other processes, I have been forced to neglect this one; but I may add that it appears to me particularly applicable to the engraving of lace and other fabrics, which would only require to be impregnated with a solution of copper, to be transferred to the zinc, and then be engraved in relief.

I now come to my second process, or reproduction of old engravings. I employ two methods; the first, which I will call Process A, depends—

Firstly, Upon the antipathy of water for fatty bodies.

Secondly, As the preceding, upon the metallic precipitations, and the affinities of acids.

In fact ordinary printing ink is greasy, and water, instead of having any attraction for it, is, on the contrary, repelled.

If, then, we place an engraving so as to float evenly with its back or wrong side upon a metallic solution, the aqueous liquid penetrates the paper slowly by imbibition, only around or between the lines formed of the greasy ink. After removing the proof from the bath, it is wiped lightly and placed with its face upon a plate of zinc, and a uniform pressure applied. The metallic salt of the solution is immediately decomposed, reduced, and precipitated on to the plate, which it covers all over with its metal (excepting where the lines of greasy ink occur) in such a manner as to give a negative image in relief representing with the greatest exactitude the design or engraving which has served to produce it. A few moments are sufficient to produce this result; even photography does not operate with more promptitude and fidelity. Negative proofs may at once be taken from the plate by the ordinary printing process, which proofs, by repeating the process, will produce positive plates of zinc. Or the positive plates may be made by at once attacking the zinc, covered with the negative image, by means of a voltaic battery, or in a bath containing 10 per cent. of nitric acid. The metallic solutions which I at first employed upon zinc were formed with salts of lead, copper, or bismuth, but the chloride of gold has latterly yielded me the best results; this is readily explained, on the one hand, by the facility of reduction which the salts of gold possess, and on the other hand by the resistance which this metal offers to the attack of the acids. The solution is composed of about 2 parts of chloride of gold to 100 parts of distilled water.

This first method possesses the great advantage that it does not injure the original proof, which may thus be used an almost indefinite number of times, all that is necessary to remove the metal which is reduced on its surface being to plunge it first into acidulated water, which dissolves the metal, and then into ordinary water, which removes all traces of the acid.

Guided by analogy, I have proceeded from these experiments to others, and it may not be without interest to speak of some of them and to add that engravings may be transferred on to metals by impregnating them with alkaline solutions of chlorides, sulphurets, bromides, and iodides, and then applying them, as above, on plates of pure or silvered copper, which will then present, according to the heat to which they are submitted in drying them, images in iridiscent colours of a very beautiful effect, with a slight relief caused, when operating upon plates silvered by means of mercury, by the volatilization of the latter metal by the heat.

This process of the reproduction of proofs by imbibition may be extended still further, and applied to engraving upon glass, and to printing woven fabrics. In the first case it suffices to impregnate the back of the engraving with hydrofluoric acid, and to apply it with its face upon the sheets of glass, which at once become dulled and then engraved by the corrosive influence of the acid. In the second case, I propose to employ the chemical phenomena known by the name of double decompositions, and the following is the method of operating: The engraving is to be impregnated, as above, with pyrogallic acid, or with a mordant capable of re-acting upon a fabric previously impregnated with sulphate of iron, or otherwise suitably dyed, and then applied with a uniform pressure upon the stuff. The engraving may in this way be transferred to the fabric in a few minutes.

The phenomena are very simple; the pyrogallic acid transforms the sulphate of iron on the fabric, into black pyrogallate of iron, and the mordant decolorizes or fixes the dye of the fabric in all the white parts of the proof. The number of impressions which may thus be obtained is almost unlimited; the original engraving, after being washed, will serve as many times as may be desired.

My second method of reproducing old engravings, and which I will designate as Process B, has for its objects, firstly, the transfer of the engraving, and, secondly, the engraving of the transfer, and depends—

1stly. Upon the transfer.

2ndly. Upon the phenomena of electro-chemistry.

The transferring of old engravings presents many difficulties, in fact, when a proof has been kept several years, the fatty body of the ink is completely resinified, and forms with the carbon an almost impenetrable mass, presenting a very great obstacle to the revival of the ink. If the ink employed is too liquid the paper absorbs, little by little, all the greasy matter thereof, and thus another difficulty is encountered. On the other hand, the nature of the paper, its texture, porosity, and thickness, and the sizing which it has or has not undergone, are so many obstacles which have to be overcome.

After numerous experiments I have at length been enabled to surmount these difficulties almost completely by applying to the surface of the proof a preparation of petroleum or turpentine; the ink soon becomes impregnated therewith, and when the proof (slightly dried between two sheets of bibulous paper) is passed under the press in contact with a steel plate, this preparation, having a greater attraction for the plate than for the paper, soon becomes detached from the latter, carrying with it a small portion of the black of the ink.

I am perfectly convinced of the success of these transfers, but in order not to compromise the safety of bank-notes, drafts, &c., which can be faithfully transferred by this process, I shall not enter into the details of this manipulation, but pass on to the method of engraving such transfers.

All that is necessary to effect this is to plunge the plate into a bath composed of a saturated solution of sulphate of copper containing a small quantity of nitric acid, when the copper is immediately precipitated upon the plate in all its metallic brilliancy leaving, however, the lines intact, so that the copper then serves as a varnish to resist the acid, whilst the steel, having a greater affinity than the copper for the acid, is corroded or "bitten in" thereby, under or through the lines, by the phenomena of electro-chemistry. The problem may be summed up in two words, viz., *coating* and *biting* at the same time.

The effect produced may be described as follows:—When the steel plate (with the drawing or transfer in greasy ink on its surface) is plunged into the acid solution of sulphate of copper, those parts of the surface which have not received any portion of the ink are immediately coated with metallic copper. The solution penetrates at the same time by imbibition through the greasy matter of the ink and reaches the metal beneath, when a voltaic pair (copper and steel) is immediately constituted, the copper already deposited forming the negative pole, and the steel, not yet attacked, being the positive pole. An electro-chemical decomposition of the sulphate of copper then takes place, and at the same time the steel is attacked by the sulphuric and nitric acids. The operation proceeds tranquilly, without any effervescence or disengagement of gas; no other kind of "biting-in" takes place so calmly. About ten minutes afterwards, the steel plate is withdrawn from the bath, perfectly engraved, and nothing further is required but to remove the copper from the surface by means of ammonia, to render it fit for printing from by the ordinary plate printing process.

One of the most remarkable effects of this process is that all the gradations of an engraving from the highest lights to the deepest shades, are produced at one simple operation, without any artificial "stopping out" whatever; the length of time each part is under the action of the acid being always exactly proportioned to the thickness of the layer of ink at that particular part. For example, when the plate is first placed in the bath the copper instantly covers and protects from the acid the exposed surface, *i.e.*, the white parts of the engraving; the acid next attacks the finest lines, or those parts where the thinnest coating of ink exists, and by the time these lines have been engraved to a sufficient depth, the copper spreading laterally from the edges will have entirely covered and "stopped out" these portions, whilst the broader and deeper lines will resist the deposit of copper (and hence remain exposed to the action of the acid) for a longer time; and so on to the deepest shades, which will remain still longer exposed to the action of the acid, whilst all the lighter parts of the engraving are effectually protected by the copper deposited, so that in fact, each line will be infallibly engraved to a greater or less depth in exact proportion to the thickness of its layer of ink, which is precisely the effect desired. This same phenomenon also prevents the possibility of lateral corrosion, and, on the contrary, causes each line to narrow as it deepens, and to assume as near as possible, the V-shaped form produced by the cut of the angular point of the graver..

Third Process. The method above described, of acting upon steel plates by sulphate of copper, naturally led me still further, and thus I arrived at my third process, which is merely an extension of the preceding method.

It consists in making an autographic, lithographic, or other transfer on to the steel plate, not by a preparation of turpentine, but by a greasy ink only, or in making a heliographic or photographic drawing or transfer on the same by means of bitumen of Judœa or alkaline bichromates, or in drawing on the steel direct with indian ink, chalk, or black lead pencil; or painting thereon in oil or pastel, or drawing in perchloride of iron or acid; in a word, making a transfer or direct drawing upon the steel plate, with any body or medium capable of resisting the deposit of copper, without opposing the attack of the acid, or with any body capable of depolishing the steel in parts which will be engraved when the plate is submitted to the action of an acid bath of sulphate of copper.

I may thus generalize my method and extend my particular process of biting on steel to an entirely new kind of engraving, destined, I believe, to take an important rank in this art as a rival to the aquafortis and lithographic processes.

The process is remarkable from the circumstances under which it takes place, and surprising from the results which it yields; for to attack the greasy body, which until now has been a protection to the steel, and to leave the polished surface intact is exactly the counterpart of any process hitherto known. To preserve to each artist his own peculiar touch and feeling; in a word, to perpetuate his individuality; this is to arrive at the object so earnestly sought, viz., translation without the aid if an interpreter, or, in other words, engraving without the assistance of the engraver.

This process has the two attractions of novelty and simplicity; it does not require practice, and I may add that it surpasses all other processes in the rapidity and fidelity of its execution. Its importance for engraving geographical maps and topographical plans is very great, if we consider that an engraving upon stone (which rivals copper plate in fineness) can be transferred readily on to steel by these means; we then have an economy equal to one-third in time and one-third in expense. The plates are almost inexhaustible, the printing always the same, and much superior to lithographic transfers, which always deteriorate by printing, and at the same time a heavy, cumbrous, and fragile material is also done away with. It may be applied to engraving arms for warlike or sporting purposes, and cutlery, for the reproduction of copper or steel plates, to lithographic engravings, or the transfer of lithographic engravings on to steel, and to the engraving of photographic proofs or transfers, whether obtained by means of bitumen of Judœa or alkaline bichromates, and to a variety of other useful purposes where rapid, faithful, and economical engraving is required.

In their report to the Imperial Institute of France, the commission say:—

"M. Vial has presented to the academy a memorandum, entitled "Researches on metallic precipitations, or essay on the reproduction of old engravings, preceded and followed by new processes of engraving"—which work has been referred for examination to a commission composed of Messrs. Dumas, Regnault, and Becquerel (reporter).

"Although these processes have been patented, your commission has thought that as one of these processes is founded upon an electro-chemical property which your commissioners believe to be unknown, it is their duty to inform the academy thereof without pronouncing on the artistic merit of the process, of which they are not competent judges.

"The following is the description of the process:—An engraving or drawing in greasy ink is transferred on to steel, or a drawing is made on the plate in the same ink. The plate is plunged into a bath of a solution saturated with sulphate of copper, to which is added a small quantity of nitric acid: five minutes after the plate is withdrawn and washed, the copper deposited is removed with ammonia, and the engraving is finished; the lines of the drawing are in intaglio. In the ordinary processes of engraving on metal, the fatty bodies which form the design preserve this metal, in the parts which they cover, from the corrosive action of the chemical agents; thus the engraving is obtained in relief. With that of M. Vial, the engraving is immediately obtained in intaglio. A similar effect takes place in drawing in chalk, blacklead pencil, or pastel, or on allowing points of rust to form on the steel.

"It is scarcely possible to imagine a more simple process of engraving. Let us endeavour to explain the effects produced. When a plate of steel, on which is a drawing in greasy ink, is plunged into a saturated solution of sulphate of copper containing a small quantity of nitric acid, that part of the surface which has not received the greasy ink is immediately coated with metallic copper, the particles of which have little adhesion between themselves, in consequence of the combined actions of the sulphate of copper and the nitric acid upon the steel. The solution penetrates at the same time, little by little, through the fatty matter by imbibition, and reaches the metal by the time that the voltaic pair, copper and steel, is constituted: the copper already deposited is the negative pole, the steel not yet attacked is the positive pole. The decomposition of the sulphate of copper then becomes electro-chemical; the steel is attacked by the sulphuric and nitric acids to a depth proportionate to the thickness of the layer of ink; the copper which proceeds from the decomposition is precipitated on the edges, and eventually raises the ink up in such a manner as to form a design in relief in copper, which is then dissolved by ammonia. The effects produced have this remarkable feature, that the gradation of the hollows represents exactly that of the tints of the drawing, so that the engraving is a faithful representation thereof. Your commission are assured, and are satisfied, that the process of M. Vial when proved by competent artists, has appeared to them well worthy of attention in relation to art.

"It is not without interest to remark that the lightest lines in the ink, which are the first penetrated by the solution, are those upon which the action has least energy, and where it ceases soon after, when the copper deposited on the edges spreads itself in such a manner as to cover over the points attacked. In a word, the action is slower to take place, and the effects are deeper, in proportion as the layer of ink is thicker. It is in these effects that the efficiency of M. Vial's process of engraving consists, the importance of which the Academy can appreciate, on viewing the proofs of a certain number of engraved plates, several of which have been engraved in the presence of your commission, and which have been deposited at the office.

"Your commission proposes to you, consequently, to thank M. Vial for his communication, and to give their approbation to the application to engraving on steel, which he has made, of a property the effects of which have been hitherto unobserved, and which is capable of rendering useful services to the arts."

The conclusions of this report have been approved by the academy.

Since writing the above I have succeeded in transferring some old prints, both of engravings and letter-press, on to stone in the most perfect manner, by my process. Some proofs of the letter-press will be shown to the society, and also the stone with the transfer of the engraving thereon.

DISCUSSION.

Mr. **George Wallis** said he could not but take exception to the term "instantaneous" as applied to this process. In the first place, because they had had to wait ten minutes while the plate was being prepared; and secondly, because he had the honour last session of bringing a process before this Society which effected the engraving of a plate in a few seconds instead of several minutes. He would, however, at once say he believed the process now brought before them was of an exceedingly valuable character, and in many respects calculated to be of great use in the arts. The fact that the artist could make his own drawing on the plate, so that the touch and spirit of the original should be reproduced in the engraving, was in itself a most important advantage. This was one of the merits, as he conceived, of the process he had had the honour of bringing before them last session, and he still prided himself upon that process as one possessing many special advantages and conveniences of its own, though he saw no reason to feel any jealousy of the one they had just heard described. If a photograph could be first transferred to stone and then the photo-lithograph transferred by this process on to a steel plate, a great advantage in an increased power of multiplying proofs was obtained, inasmuch as the lithographic stone became deteriorated in working in a far greater degree than the steel plate. He thought, however, from the specimens he had seen, that this process did not, in some respects, quite come up to that of which he claimed to be the inventor, inasmuch as by his plan the broader tints were more readily reproduced. In illustration of his process, it would be remembered that a drawing was made in the room with a brush; it was taken from the table and placed in a small machine, and in two or three seconds a plate was produced, which was immediately printed from. He thought, in point of refinement, the process of M. Vial was superior to his own, as well as in its power to throw off a large number of impressions, and therefore he hoped to see it fully and properly developed. He hoped those interested in such subjects would take this process up in a friendly spirit, and try it. The difficulty which inventors met with at the outset was to get people to try anything new. The cry was continually for something new, and when it was produced the remark was, "Oh, it is not like what we had before." This was especially the case in inventions applicable to the fine arts, though it was also the case with respect to manufactures.

Dr. **Bachhoffner** inquired whether the surface of the steel plate was not granulated in some degree in the first instance when placed in the bath, inasmuch as there must be an equivalent of iron dissolved for every equivalent of copper precipitated.

Mr. **Davies** (who attended to explain the process on behalf of M. Vial) replied that the surface of the steel plate remained as polished as before, and was not in the least degree granulated. The polished surface of the steel plate was instantaneously protected by the slight coating of copper deposited upon it the moment it was placed in the bath.

The **Secretary** observed, that no doubt what Dr. Bachhoffner stated must be chemically true. There must be an infinitesimal portion of the iron dissolved before the precipitation of copper took place, but he understood that practically that was so small as not to destroy the polish upon the steel plate, the proof of which was that when it was printed from the whites showed no granulation.

Dr. **Bachhoffner** remarked that the biting into the metal must evidently be only to a very slight depth. He would, therefore, ask whether any calculation had been made as to the number of impressions that could be taken from one plate, because in the case of an ordinary engraved steel plate it would afford a vast number of impressions. In this case the very small depth to which the plate was bitten in by the chemical action, led him to imagine that not many fine impressions could be taken, even with the most successfully engraved plates.

Mr. **Davies** replied, that M. Vial had communicated to him that he had never taken more than 750 prints from the same plate.

Dr. **Bachhoffner** said that number was satisfactory, considering the facility with which the engraving could be reproduced, although, as compared with an ordinary steel plate, it was a very small number of impressions.

Mr. **Hensman** said, that from the specimens he had seen he could but think that this process was one well worthy of attention.

Mr. **George Cruikshank**, responding to the invitation of the Chairman, said, from what he had been able to see of this process, and judging from the specimens exhibited, he considered it a very valuable addition to the means of reproducing works of art. In a commercial point of view it was also worth consideration, for although it had been stated that only 750 impressions could be calculated upon from one plate, yet from the rapidity with which the plate could be reproduced, all practical difficulty in this respect was removed, for the number of impressions was thus practically unlimited. Some of the specimens exhibited were exceedingly well executed, and he should be much delighted to be allowed to make some experiments with this process himself. At the same time he did not believe it would ever completely supersede the etching tool; for instance, such small faces as he put into some of his illustrations, he did not think could be produced by any other instrument than the etching point. The fact was, however, that an artist who had the power of design did not often care to bestow much time upon mechanical labour, and therefore such a process as this would be valuable to him. It had been his misfortune, perhaps, in early life to spend a great deal of his time in the manual operation of etching. He had the power of designing as fast as he could think, but it had been his fate to employ many years in mechanical operations. For his own part he should never attempt to follow this process out with the idea of entirely superseding mechanical engraving, though, as he had already said, it would doubtless be valuable for many purposes. He was at the present time employed in preparing an engraving of his own picture of "The Worship of Bacchus," and, in order to preserve the character of the figures, he drew them himself in outline, and left it to others to fill in the details and shadows. With reference to this process he saw many advantages in it, and he believed, if introduced into this country, it would be largely and successfully employed for a great variety of purposes. The designer, in making a drawing upon wood, put in the shadows with a dash of the brush, and left it to the mechanical skill of the wood-engraver to produce those shadows in lines. It was the same with mezzotint and other engravings. He repeated his opinion, that while this process of engraving would never entirely supersede the etching tool, it was, nevertheless, a most valuable addition to the means of reproducing works of art.

Mr. **Joubert** said the process which had been described to them this evening, and exemplified, as far as it went, by the proof just printed, appeared to him to be a very interesting one, and to be entitled to attention as presenting several novel features. Whether it was capable of further development, so as to produce results in advance of what they had yet seen, time alone would show. One characteristic feature of this process was that it acted upon an entirely opposite principle to that generally employed. There was one thing in the details of this process which appeared to him very extraordinary, and that was that (as stated by the inventor) the lines of the engraving were formed of a V-shape, similar to a line cut with the graver, although it was known that the effect of acids upon metal was to bite in horizontally as well as vertically. If that were the case it was very remarkable, because it was an example of effects produced by acids which had never been obtained before. He had himself been for many years practically engaged in engraving, and he had always found that the great difficulty in any chemical process hitherto applied, either on copper or steel, had been to prevent the acid running under the lines and widening them at the bottom. This process, however, appeared to effect what they had been trying to obtain ever since the art of engraving was invented. Some of the specimens exhibited presented features and qualities which had never been produced by any previous process; he alluded to the peculiar sharpness of the lines displayed in the small architectural drawing exhibited, which were so distinct that they were almost equal to lines cut with the graver. The faint impression from the plate produced this evening, he attributed only to the insufficient time of exposure to the action of the acids. If this process could accomplish what they saw in these specimens, it was very valuable, and they were much indebted to the inventor for having brought it before them. It, however, did not appear to accomplish one thing, which was a desideratum in there production of photographs, viz., the half-tone. Hitherto all previous processes had stopped at that point, and in this respect, although it was somewhat in advance of anything he had yet seen, it was not altogether successful. What they wanted was to reproduce the half-tone of photographs so that the pictures might be printed from a metal plate. As yet the intervention of photo-lithography was still required, and photo-lithographs were always imperfect in this respect. He hoped the inventor would be able to carry his process on so as to arrive at the result of producing a plate direct from a photograph. If he succeeded in doing that, he would indeed accomplish a great work, but for what he had already done he well deserved the thanks of all lovers of art.

Dr. Bachhoffner said without depreciating the importance of the invention, it reminded him of similar results obtained by Mr. W. R. Grove. In the preparation of the ordinary daguerreotype the surface of the plate was covered with a thin film of gold, and Mr. Grove made the coating of gold on the plate serve as an etching ground, and by the action of nitric acid the design was bitten into the plate, but the process was of slower application than that which had been illustrated this evening, and although proofs had been taken from the plate, the depth of the etching was so slight that it was of no commercial value. The statement made with regard to the V-shaped line produced by M. Vial's process seemed to involve a deviation from natural laws, for it was plain that acid solutions, whether acting directly or by double decomposition, would corrode the metal in a lateral as well as a downward direction. If it could be shown by microscopic observation that in this process there was an absence of lateral bite, it was the most important invention that had been brought forward for many years. That, he thought, still remained to be proved. He had no doubt, for certain classes of engraving, the process was of great value, but the question he had raised in the first instance still remained in his mind, namely, the granulation of the steel, for he observed in some specimens that the whites were not perfectly clear, and this showed that the surface of the steel was slightly acted upon. If it was the case that the plate, before being printed from, required polishing or burnishing, it might deteriorate the fine lines of the engraving. With regard to the number of impressions which one of these plates would yield, an ordinary engraved steel plate would produce many thousands, whereas one of these plates would only produce a few hundreds, and, before another could be produced, the intervention of the artist would be again required, unless the electrotype process was resorted to.

Mr. Cruikshank had understood that the original drawing might be preserved and reproduced on fresh plates as often as was required. As to the V-shape of the lines in the plates, that was a most interesting fact to those who had never seen anything of the kind *before*. He would ask whether the original drawing could be preserved, so as to reproduce the plates continually?

Mr. Davies replied that he did not think it possible to use the original drawing again, but an impression from the plate would give as many duplicate plates as were required. Upon the question whether the lines were narrower at the bottom than at the top, and as to the lateral biting of the acids, a microscopic examination of the lines would settle the question.

Mr. Lock referred to a process of reproduction of engravings brought out about the year 1845, illustrations of which accompanied one of the numbers of the *Art Union Journal* of the time. Since that time he had heard nothing more of the process.*

Mr. Joubert said the process just alluded to was this—The plate and engraving to be reproduced were prepared with a certain solution, which caused the engraving to adhere to the steel plate, the engraved portion being face to face with the plate. This being done, the paper was removed from the back of the engraving, leaving the ink adhering to the steel plate. A certain varnish was then spread over the plate, which adhered to it only in those parts not covered with the ink. The plate was then washed in a certain bath, and the varnish adhered, while the ink was removed. The plate was then treated with acids, but the result, he believed, was very imperfect, owing to the lateral biting. To produce anything like the original, the plate, after the above treatment, required to go into the hands of the engraver, and be almost engraved over again.

Mr. Dickes said that, in reference to the V-shaped corrosion of lines in the steel by acid, referred to by a previous speaker, we need not be incredulous, as if a new law respecting the action of acids had been alleged to have been discovered. In the process before the meeting there was no new law—there was simply a taking advantage of two well-known facts—one relating to the action of acids, the other to the deposit of copper. When copper was deposited it was not only thickened, but slightly increased at the edge; this increase would trench upon and narrow the line in course of biting by the acid, and would counteract widening or under-biting — the combined action resulting in a line narrower at the base than at the surface, in fact V-or shallow U-shaped. Our best thanks were certainly due to our foreign visitor for his clear, practical, and interesting paper, and we must heartily wish for him the reward his thought and industry had deserved.

Mr. Hensman suggested that practical proof as to the V-shape of the lines might be obtained by allowing a plate to remain in the bath, so as to be bitten far too deeply for use; this would make the form of the lines quite evident, and capable of examination.

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* This invention is described in the *Art Union Journal* for 1st January, 1845, which number contained a copy of a line engraving by Blanchard, after a painting by Delaroche. The editor of that journal states that from the plate produced by the inventor (in fourteen days from his having been supplied with an impression of the original engraving, the plate of which the inventor had never seen) he had had taken between 4,000 and 5,000 impressions, and that he had no doubt it was capable of yielding twice that number. Several engravers, to whom the copy and original were shown, declared they were so thoroughly alike that any one might suppose the two to be from the same plate. The editor further remarks that the original print was returned uninjured. He also states that he had seen a plate prepared from a drawing in little more than a quarter of an hour.

Mr. Wentworth Scott suggested that a distribution of plates should be made amongst such members as were willing to make microscopic examinations, and the results might be announced in the Society's *Journal*.

The Chairman said the pleasing duty now devolved upon him of proposing a vote of thanks to a distinguished foreign gentlemen who had come over to this country himself for the purpose of presenting before them his very interesting and ingenious process of engraving. All the speakers had agreed in saying that the invention was a very valuable one. The specimens exhibited were certainly very admirable, and though the illustration which had been produced in the room was not equal to former efforts, that, in fairness, might be accounted for by the hasty manner in which the experiment was conducted, from a desire not to keep the audience waiting. This process had been honoured with the recognition and thanks of the Imperial Institute of France, but Art was of no country, and, as Mr. Wallis had so justly said, there was no feeling of jealousy on our part that such a process should have emanated from a foreigner. He was sure he spoke the feeling of the meeting when he said they cordially welcomed this French invasion of Art, and he was confident they would cordially respond when he asked them to accord their thanks to M. Vial for his highly valuable and most interesting paper.

The vote of thanks was then passed.

The process described in the paper was practically illustrated by M. Vial himself, who produced a steel plate on which a drawing had been made, immersed it in the bath, and at the end of a few minutes took impressions from it. These, however, had not quite sufficient depth, owing to the plate having remained too short a time in the bath. A number of prints from plates on which drawings had been made by Gavarni and other leading French artists, as well as transfers from engravings, were also shown, and appeared to be generally very much admired.

The Secretary announced that on Monday evening next, at 8 o'clock, Mr. Burges would commence his course of seven lectures "On Art applied to Industry;" and that at the meeting on Wednesday evening next, a paper by Mr. J. Beavington Atkinson, "On Fresco-painting as a suitable mode of Mural Decoration," would be read.

The following letter has been received:—

Sir,—Having arrived late, and only heard part of the discussion on Monsieur Vial's paper, I can but state my opinion of the process from a conversation with the inventor, and an examination of the specimens. I must bear testimony to the great beauty of several of them, the process, like that of Mr. Wallis, being one that renders with much truth the touch of the artist, and as such gives the true spirit, so rarely rendered when the aid of the engraver intervenes. I do not think that it will supersede the burin or the etching needle, though it is capable of things they cannot produce, but in a lesser degree, it being at present an untested process, for the inventor informed me that it has not been applied to the purpose of book illustration—the wear and tear of numbers—the point at which most inventions of this sort break down. Isolated specimens, of great beauty, may be obtained, but the great test is wear; and though I believe M. Vial's process will give a greater number of durable impressions than that stated by his agent, I think, from the nature of the incision, that number cannot be very great, for, instead of the cut being like that of the burin, V-shaped, it is somewhat as a shallow U, without the undercutting effected by the acid. Of course, a great deal depends on the strength of the line to retain the ink and then deliver it on the paper—things time and experience alone can prove. That it is very beautiful, those who have seen the specimens will not deny, and very simple—just the thing for the artist, the amateur, and the forger, who wants to produce or re-produce a few choice impressions. To the producer of spurious notes it will prove an easy means of effecting his object.

I am, &c., John Leighton.

Proceedings of Institutions.

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Birmingham and Midland Institute.—The report presented at the annual meeting, held January 11th, William Scholefield, Esq., M.P., President, in the chair, states that the external appearance of the building has undergone a great change by the erection on the adjacent land of the Central Reference Library, which is now fast approaching completion. The exterior of the new building follows, with but slight alteration, the original design of Mr. Barry, so that the whole façade will have a uniform appearance. The interesting collection of works of art which was opened for exhibition to the persons attending the last annual meeting was, at the urgent request of many members, retained for two days following the meeting, and proved very attractive, about 1,500 persons visiting it during that time. The number of members of the Institute is about the same as at the commencement of the year. The number of guinea subcribers still falls short of 700, and the council are impressed with the fact that that number is wholly disproportionate to the population and wealth of the town. Thirty lectures have been delivered during the past year, as against twenty-nine in 1862; among them may be mentioned two on "Æronautics," by Mr. James Glaisher, F.R.S.; one on "Water and its circulation through Rocks," and one on "Volcanoes and Earthquakes," by Professor Ansted, F.R.S.; two on "The new applications of Science illustrated in the International Exhibition," by Mr. Robert Hunt, F.R.S.; one on "The Inner Life of the House of Commons," by Mr. Shirley Brooks; two on the "Life of Dr. Johnson," by Mr. George Dawson, M.A.; one on "English Literature," by the Rev. A. J. D. D'Orsey; two on "The Progress of Civilization" (illustrated by collections of coins) by Mr. H. Noel Humphreys; one on "Socrates," and one on "Sir Thomas More," by Mr. George Dawson. There was a decided improvement in the attendance. Believing that it was peculiarly within the province of the Institute to call attention to recent advances and discoveries in the application of science to manufactures, the council made arrangements for the delivery in the course of last spring term of a series of lectures on the Exhibition of 1862. The subjects chosen bore especial reference to the manufactures of the district, and the lectures were designed to illustrate the progress made in those branches of manufacture since the Exhibition of 1851. These lectures were as follows:—"Mining and Metallurgy," by Mr. R. Hunt, F.R.S.; "Chemistry of the Exhibition," by Mr. W. Crookes; "General Metal Work," by Mr. W. C. Aitken; "Works in Precious Metals, Ecclesiastical and other Metal Work," by Mr. F. Skidmore; "Stained and other Glass," by Mr. John Powell; "Design as shown in Works exhibited in the Exhibition," by Professor Chamberlain. The council secured for this course the services of several gentlemen who had practical acquaintance with the different subjects to be treated, and the series was consequently one of great interest. Tickets were issued to artizans for the course at a reduced charge, but the Council regret that only a very limited number of tickets were sold. The number of persons visiting the Museum during the past year has been 1617. The number of visitors to the Specification Library has increased, being 626 in 1863 against 578 in 1862. The meteorological observations have been regularly continued during the past year. A valuable collection of works of art, known by the name of the Warwickshire Drawings, has been arranged and placed in the news room, and has proved to be of great interest. All friends of the Institution will deplore the premature loss of Sir Francis Scott, who so energetically and faithfully served its cause, and has bequeathed to it his valuable collection of Limoges enamels. The bequest is accompanied by a legacy of £50, for providing a suitable case "for the continued protection and public exhibition of the said enamels." In the Industrial Department, several changes of considerable importance have taken place. The class for practical mechanics has proved highly successful. The German class, also, is a thriving and increasing one. A change has been made with reference to the chemistry class; as the course of instruction in that science extends over two years, it has been thought desirable that a second class should be provided, so that the students in their first and second years should be distributed into two separate divisions. The result is at present highly satisfactory, the number of chemistry students being larger than at any former period. A class on Saturday evenings for elementary singing has been opened, the admission being a penny a night for each person. This class has been in existence during the autumn term, and has been very successful. The attendance at the penny arithmetic class has been, week after week, so large that the room has been most inconveniently crowded. In order to afford increased accommodation for this class, the Council have recently fitted up a second room, which will be occupied by the more advanced students. Following up the successful experiment which was tried in 1862, the Council induced the president, Mr. Scholefield, to inaugurate the autumn term by an address to the students and members, of whom a large audience assembled on the occasion. The address was a very able and interesting one, and the Council feel much indebted to Mr. Scholefield for the manner in which he carried out their wishes. The Council announce with great regret the loss they have suffered in the resignation of several of the teachers of the classes, whose efficiency they warmly acknowledge. The usual examinations by the Department of Science and Art and the Society of Arts were held in the spring. A considerable number of students from the Institute classes presented themselves for the former, and the results are highly satisfactory. The Society of Arts examinations were attended by a smaller number than usual of the Institute students. The income and expenditure accounts show that the general financial result of the year is an excess of income over expenditure of £22 9s. 10d. The comparatively small sum of £81 3s. 2d. would entirely free the Institute from every existing liability.

Hunslet Mechanics' Institution (Yorkshire Union).—The annual meeting was held on the 28th January; Mr. Ald. Blackburn, the president, in the chair. The report gave a favourable account of the state and progress of the Institution. The number of members had increased from 305 to 364, and the attendance at the classes had also considerably improved. The treasurer's account showed that, notwithstanding much larger receipts, there was a balance of £17 14s. against the Institute, owing to an outlay for repairs, fittings and furniture, and additions to the library. The debt on the building had been reduced from £588 18s. to £500, and several promises had been made for further reduction.

Metropolitan Association for Promoting the Education of Adults.—The first annual meeting was held on the 29th ult., in the house of the Society of Arts, Vice-Chancellor Sir W. Page Wood in the chair. Mr. Harry Chester, chairman of the committee, read the report, which stated that his Royal Highness the Prince of Wales had signified his consent to become a patron of the Association, and to contribute to its funds a life member's payment of £10 10s. Earl Granville, Lord President of the Council, had accepted the office of president. The operations of the Association embraced the whole of the metropolis, and under the term adult comprehended all those members of the industrial classes who have reached the present ordinary maximum school age of elementary schools for the poor, viz., the age of 12 years. The report, after describing in detail the organisation and machinery of the Association, reviewed its operations during the fifteen months that have elapsed since the provisional committee, charged with the duty of constituting it, and bringing the association into operation, was appointed, on the 2nd of November, 1862, at a public meeting presided over by Sir W. Page Wood. By the 13th of December, 1862, the committee of management was constituted, and began to take measures to set the association to work. The time was short, for the earliest examinations were to be held in the ensuing March. Public meetings, at which deputations from the association attended, were held, and various publications were freely distributed, to make known to the working classes, and to the friends of public education in the metropolis, the existence of the new association, its objects, and its modes of operation. Notwithstanding the shortness of the notice, 229 candidates presented themselves at the examinations, and 89 succeeded in obtaining certificates. The report touched upon most of the Institutes connected with the Association. It mentioned the Youths' Institute, Bayswater, as an institution of great interest and promise. It was established in January, 1860. It has a reading-room, a library, a penny bank, a cricket club, a gymnasium, occasional excursions, lectures, and concerts. It has also Bible classes, classes for writing, arithmetic, book-keeping, and drawing. Although these novel institutions have stood the test of experiment for only a few years, they appear to promise excellent results; and the experiment of establishing them may advantageously be tried in many other parts of London. After referring to police instruction classes and the various working-men's institutes, the report next referred to working-men's clubs, some of which may be regarded as educational institutes, for they are places where, with other advantages, systematic instruction is regularly provided; and even in inferior clubs where there is no such provision, if they are fairly conducted, they tend with great effect towards the improvement of their members. The first established working-men's club in London, the Westminster Working-men's Club and Reading-rooms, is that which owes its origin and its continued existence almost entirely to the benevolent exertions of Miss Adeline Cooper. The Association desires to encourage industrial instruction and training, particularly for females; but this subject is full of difficulties. The poor too often fail to appreciate its importance. They look with disfavour on attempts to give systematic and practical instruction in industry to their children. Time thus devoted seems to them too frequently to be time abstracted from mental instruction, from learning, and therefore time thrown away. Here, as at every other turn, the promoters of education are obstructed by difficulties arising out of the ignorance and prejudices of uneducated parents. The remedies are to diminish the number of uneducated parents by extending the means of education, and especially by extending the means of educating adults, and also by inviting their co-operation, as far as possible, in the work of educating their children. The association desires also to direct the attention of the managers of schools to the importance of physical education. The games of the Kinder-garten are useful, not only in training the eye but in increasing the general intelligence, the cheerfulness, and the health of the children. As they grow older and stronger they should be furnished with opportunities for playing at games and exercises which not only train the eye and the hand, but develop and invigorate the form, and promote agility, strength, and health. The annual account, comparing receipts and payments, shows there is a balance of £8 11s. 2d. in favour of the association, but, taking liabilities into account, it is £7 14s. 10d. the other way. The committee earnestly appeal to the friends of education for funds to enable this work to be carried out. The funds at the disposal of the committee have not hitherto been such as to warrant the occupation of the whole time of a paid officer. The services of Mr. Sales, as secretary, have deserved the hearty approval of the committee. The CHAIRMAN, after the reading of the report, proposed that they should elect his Royal Highness the Prince of Wales patron by acclamation. Trained and educated as few Princes of Royal blood had been, he had ever shown himself eager to promote all the educational and benevolent efforts for the improvement of the people which were so largely patronised by his late lamented father. In remarking on the proceedings of the association he expressed the gratification he felt at finding that it had been able to do so much with so small a sum as £112, and hoped that the slight addition to that amount asked for in the report would be forthcoming to enable the committee to fulfil their desires for the forthcoming year. He then proceeded to address the pupils connected with the various institutions to whom certificates and prizes had been awarded by the examiners, for proficiency in religious instruction.—A cordial vote of thanks was given to the chairman, who, in responding, warmly expressed the deep interest he took in the success of the Association.

PIMLICO LITERARY, SCIENTIFIC, AND MECHANICS' INSTITUTION.—This Institution is now in full possession of the premises built for its occupation, and forming part of the building known as the "Pimlico Rooms." A public meeting, at which Earl Grosvenor will preside, is to be held on the 5th of February, to form a Local Educational Board. Several new classes are projected, and, in addition to those which have been formed now a long time, two have recently assembled—the first for the study of book-keeping, &c., under the tuition of Mr. William Vaughan, winner of the Prince Consort's Prize in the past year; and the second for instruction in chemistry, by Mr. F. Coles, a certificated teacher of the Science and Art Department. The second series of lectures, &c., for the session is enriched by four to be given by Mr. H. F. Chorley, on "Music."

Fine Arts.

ART COLLECTIONS AT SOUTH KENSINGTON.

The Department of Science and Art have just issued their new edition of the "Inventory of objects forming the Art Collections of the Museum at South Kensington." The inventory has been entirely revised and rearranged. As nearly as possible, the price, size, and other details, accompany each object. For the information of visitors, "an alphabetical list of artists, art workmen and producers who are named in the inventory" is inserted in the introduction, and, for lovers of statistics, "analyses of the art objects arranged under chronology, and under countries, according to the present classification;" a table of the "approximate cost of each class," and an index of the "species of objects named." It may be interesting to know something of the history and origin of this valuable collection, and the following is an extract taken from the introduction:—

"1. The commencement of the collections forming the Art Museum dates from the year 1846, when a committee, appointed by the Board of Trade, recommended that a Museum should be formed in connection with a School of Design at Somerset House, which should exhibit to the students of the school, to inquiring manufacturers, artisans, and the public in general, the application of the principles of design in the graceful arrangements of forms, and the harmonious combination of colours. Some few specimens were procured in accordance with this recommendation.

"2. Numerous objects collected from the Exhibition of 1851 were purchased with a Parliamentary grant of £5,000 made to the Board of Trade (the Right Hon. H. Labouchere, M.P., President, now Lord Taunton). The specimens thus obtained consisted of examples of furniture, metal work, pottery, and woven fabrics, and were selected by a committee consisting of Mr. Cole, C.B., Mr. Owen Jones, Mr. Pugin, and Mr. Redgrave, R.A., who, in forming this collection, looked to its becoming the nucleus of a museum of ornamental manufactures.

"3. In 1852, the Department of Practical Art of the Board of Trade was constituted (the Right Hon. H. Labouchere, M.P., President), and the collection already made was publicly exhibited in the rooms of Marlborough House; and in that year the Bandinel collection, illustrative of pottery and porcelain, was acquired (the Right Hon. J. W. Henley, President).

"4. In 1854, Parliament made a vote for purchases from the collection of Mr. Bernal. Upwards of £8,583 was expended by the Department of Science and Art, under the authority of the Board of Trade (the Right Hon. Lord Stanley of Alderley, President), principally in specimens of pottery and porcelain, majolica ware, glass, and metal work, approved upon the recommendation of Mr. Redgrave, R.A. The Gherdani collection of models for sculpture was bought by the Chancellor of the Exchequer for £2,110 (the Right Hon. W. Gladstone, M.P.), and placed in the Art Museum.

"5. In 1855, £3,500 was expended in purchases from the Paris Exhibition, selected by Mr. Cole and Mr. Redgrave.

"6. The Soulages collection, which was especially rich in majolica ware and specimens of Italian furniture, was brought to England by means of a guarantee fund, headed by the Prince Consort, in 1856, and finally deposited in the museum of the department. Purchases have been made from it, amounting to upwards of £8,000 (the Right Hon. the Marquess of Salisbury, K.G., and the Earl Granville, K.G., being Lords Presidents).

"7. In 1857, the Department was transferred from the Board of Trade to the Committee of Council on Education, and shortly afterwards the Museum and offices were moved from Marlborough House to South Kensington.

"8. 1858-9, Mr. Cole, being in Italy, made notes of numerous objects worthy of purchase; and in 1859-60 Mr. Redgrave and Mr. Robinson went to Italy to effect the purchase of such objects, and numerous purchases were made.

"9. In 1860 the Gigli portion of the collection, made by the Marquis Campana, consisting of examples of Italian sculpture, was selected by Mr. Robinson, and purchased for the sum of £6,000.

"10. In 1861 the sale of the Soltikoff collection took place in Paris, and upwards of £5,982 was expended in the purchase of objects from that collection. Other additions were also made in that year from the sale of Mr. Uzielli's collection.

"11. The International Exhibition of 1862 offered opportunities of acquiring specimens of modern art manufacture, British and foreign, and objects were thus obtained, which cost altogether £3,947 (the Right Hon. the Earl Granville, K.G., being Lord President).

"12. Such have been the principal sources from which the collections have been formed. In addition, numerous other purchases have been made by means of annual votes of Parliament.

"13. The present inventory contains all objects belonging to the Art Museum, registered up to the 30th June, 1863, except casts and reproductions, which are separately inventoried. It is arranged in divisions, according to the nature of the specimens, such as sculpture, mosaics, pottery, furniture, &c. The first number is the finding No., the second (within brackets) is the present number in the Register of the Department. In cases in which a price is not named, such specimens have been purchased in lots with others or presented."

MODERN WOOD-CARVING.

A correspondent, who has studied the subject with care and had many opportunities of attaining knowledge upon it, sends the following remarks and suggestions on the nature of wood-carving, and its application to modern uses:—

It is an error, common to all professors of modern art, to look rather for the extreme of delicacy in execution and faithful imitation of an original—whether in nature or not, than to the broader consideration of how best to supply what is wanted for use. With some noteworthy exceptions, our exhibitors of wood-carvings at the Society's house last summer seemed not a little at sea with regard to the ends of their own art. We had *tours de force* of exquisite workmanship in wood that should rather have shown itself in ivory, the precious metals, or bronze; we had elaborate toys—fit only for boudoirs, and toys in the shape of trivial imitations of birds and beasts, such as offend against the canons of decorative art in a lamentable manner. Most unfortunate of the whole gathering were the numerous attempts at reproducing pictures in relief.

By way of exemplifying what is a legitimate application of the art in question to decorative purposes, yet in no way asserting that the example should be mechanically imitated, we may refer to the Gothic wood-carvings which remain in our cathedrals. We may turn to the *miserere* seats, and, limiting the case to one instance, to those of Wells Cathedral; of these, Messrs. Cundall and Downes have recently published photographs, to which we would gladly apply for illustration. The Wells *miserere* seats were produced in the best time of English mediæval art; they are very slightly injured, some not at all; they are innocent of the restorer, have none of that archaism of style which is popularly dreaded, and, with few exceptions, are so slightly "ecclesiastical" in character that they might be turned, without offence, into wall-brackets for modern domestic use.

Nothing could be freer in design, yet nothing more admirably adapted to their uses than these works. We find in them subtle illustrations of the application of curves and the disposition of masses. It is less to these qualities than to their *execution*—in the restricted sense of the word—to which we call attention. Variety is their law. Be the subjects oak-leaves, roses, or what not, in symmetrically arranged rosettes, or more cunning combinations, their stems are crisp, as with life running within, and really seem bent alive; they are freely rounded and flow with rich modelling of the surface—not at all like the mere pipes we meet with in modern art; their pedicels rise in the natural order from the bough, being opposed alternate, or springing from one side only, as the case may be, and combine with infinite changes of character. The leaves themselves are true in every fibrous band, in every form of edge; and, be they serrated, indented, or pointed, are such as nature makes. With all their freshness, variety, and crispness they do not in any case approach to imitation nor descend to copying; the leading natural expression of each example is seized and dwelt upon. In execution there is nothing to be desired for such works that may not be found here.

It is this act of selection, which obtained no less with the Greeks than with the Gothic carvers, that we commend to modern craftsmen. The sin of *rococo*, the phase of art most opposed to that commended, lies in its having no meaning; its idiocy—so to say, is patent, and its advocates, having abandoned nature for a wilful choice of meaningless curves, find those forms to be so limited that the art itself soon grows little else than poverty-stricken repetition, and the artist's interest in his work fades with its narrowed scope. Long ago *rococo* sunk into mere flourishing, triter than that our old-fashioned writing-masters delighted in. An attempt to revive *rococo* is to begin at the wrong end, and much as if having power to resuscitate the dead, we exercised it upon worn-out and diseased corpses rather than those of the young. We shall never do anything in Art so long as we neglect the intelligence of the workman, and call upon him to respect mere flourishes, the aberrations of *rococo*.

The Gothic decorative carvers wrought upon principles which, when fairly considered, show them possessed of subtle knowledge in art, and willing to bear their part in one of the most complete schemes for decoration the world has known. Fundamentally, their law forbad mere imitation of objects as stringently as did that of the Greeks. The latter carried their obedience still further than did the former, and often conventionalized natural forms until they parted with resemblance to nature altogether, and got a thing which was abstractly or geometrically beautiful, but void of suggestiveness, and not unfrequently without appropriate application. "Our rude forefathers" stopped when it seemed good to them to do so, and exhibited enough of the true character of their models to point out wherein lay the secret of their beauty. This selection did not so much *formalize* as it *emphasized* the grace of nature, so that while, for example, the carvers passed over the ultimate veins of a vine-leaf, they did not omit to tell broadly how greatly they enjoyed the rich massing of its shadows, the elegance of its outline, and the grace of its far-shooting tendrils. They would sometimes, it is true, represent accidental deformities and specialties, but in so doing they obeyed the *spirit* of the law they went by, and showed—as in the drooping or insect-bitten vine-leaf—something of its biography, so to say, more pathetic than would appear in maintaining that all flesh was *not* grass by for ever representing perfected life. Down even to these little things does the ruling spirit of Christian art pathetically declare itself to be different from the gloriously beautiful, but unpathetic classic design. In respect to Art it will generally appear that these abnormal incidents have value in composition or arrangement of line.

It is important to remind the producers of the numerous copies in relief from pictures which found places in the Adelphi, that justly to represent perspective views in alto-relief is impossible; some of the greatest masters of ancient art have failed in the attempt. Albert Durer's carving in speckstein, "The Birth of St. John," now in the British Museum, is so complete a failure, and withal so beautiful, that one regrets he did not make a picture of it. Ghiberti endeavoured to evade the difficulty by treating parts of his sculptured pictures on the gates of San Giovanni in different planes, and did not succeed.

There was a class of works shown in the Adelphi which did not come under any of the heads above named. In some respects this was the most meritorious of all. Its examples resulted from an application of the principles of sculptured art to the production of extrinsic ornaments, *i.e.*, decorations imposed upon and not developed from the form or structure of the object to be ornamented. The very excellence of these works removed them from the decorative class altogether, and ranked then as a low kind of sculpture rather than a high kind of decoration. Thus considered, the use of extrinsic ornamentation is as legitimate as is the introduction of sculptures *per se* into rooms, but it is not what is most required for service. Such carving has a tendency to sink into imitation, without design and without feeling. Done well, it must be too costly for ordinary use. What is wanted for general service is something which shall banish for ever the hideous and unmeaning flourishes of modern *rococo*, so common in our upholsterers' shops. The exquisite sculptures in wood by Mr. Flipping—"The fish and shell panels for a sideboard" (60), are worthy to be possessed by a Raphael or a Shakespeare, but they will do nothing towards introducing good decorative art among the people. Judging these works by their own standard, they are infinitely truer than any by G. Gibbons, being more elegant in form than are the works of John Evelyn's *protégé*, whose feeling for form was a little Dutch, and needed chastening. Mr. Rogers's panel, "Dead Game, &c." (23) is a superb piece of sculpture, bold as Snyders might have made it.

Dublin Exhibition.—The Royal Dublin Society having resolved to include a gallery of fine arts in the Exhibition to be held during the summer of 1864, it is proposed that the gallery shall comprise a collection of modern paintings in oil and water colours, miniatures, enamels, and similar works of art. At its last Exhibition, in 1861, the Society was honoured with contributions from the collections of the Queen, the late Prince Consort, and the King of the Belgians; also from the Hampton Court, Sheepshanks, Vernon, and many other celebrated galleries; while upon that and on former occasions, the appeals of the Society for the co-operation of artists and private collectors were most liberally met. The Society's last Exhibition was attended by upwards of 208,000 visitors. The Exhibition will open early in May, and will continue open for a period not exceeding six months. Works intended for exhibition must be sent in before the 20th of April, 1864. Exhibitors are requested to forward a concise description of all objects contributed. No person will be allowed to take copies, drawings, or photographs of the pictures or other objects without the previous consent of their repective owners; and in all cases, contact with or measurement by any instrument of the original picture, or other object, will be strictly prohibited. The committee will direct their earnest attention to measures for the protection and proper arrangements of the objects contributed on loan; but they will not be responsible for loss or injury under any circumstances whatever. The committee will defray the charges for freight or carriage from any port or railway station in the United Kingdom, upon works accepted by them, and transmitted according to their instructions; and in the case of pictures, and other objects so transmitted from foreign countries, they will likewise defray the freight from and back to the foreign seaports indicated in such instructions. All works sent in without the committee's previous instructions for their transmission to the gallery, must be carriage paid. The committee reserve the power of declining to exhibit works which they may consider unsuited to the collection, or which cannot be conveniently arranged in the building. No picture, or other work exhibited, can, under any circumstances, be removed from its place until the final close of the Exhibition, unless by special leave of the committee. Distinctive labels will be attached to such works as are intended for sale, the prices of which shall be entered in a book to be kept by an officer of the Exhibition. A commission of 5 per cent. on all sales shall be paid into the Exhibition fund. The committee entrusted with the management of the fine arts gallery solicit the loan of paintings and other works suitable to the collection, and they request that all offers to contribute may be sent in at the earliest convenience of those persons who intend to favour them with objects for the Exhibition. Communications upon this subject may be addressed to the Honorary Secretary, Fine Arts Department, Exhibition of 1864, Royal Dublin Society, Kildare-street, Dublin.

The Adornment of St. Paul's Cathedral.—A meeting of gentlemen in the city of London, who have formed themselves into a committee for carrying out the interior adornment of St. Paul's Cathedral, as originally designed by Sir Christopher Wren, was held on the 27th of January, at the Mansion-house, the Lord Mayor presiding. The work has been proceeding gradually since 1858, and in the interval about £10,000 have been subscribed towards it, exclusive of nearly £600, (which sum has recently been made up by guinea subscriptions alone,) and of £750 given by the Corporation of London, £200 each by five of the City Companies, £550 by the Goldsmiths' Company for a memorial window, £1,000 and £100 by Mr. Brown (Longman, Brown and Co.) and Mr. Butterworth respectively for similar purposes, and £400 by the Drapers' Company. The estimated cost of the whole work is understood to be from £60,000 to £70,000, and it is now proposed to raise the remainder of the money by a guinea subscription open to the whole country, but will not exclude larger donations by persons disposed to present them. Mr. Shone, the secretary to the fund, stated that there were no revenues at the disposal of the Dean and Chapter for the adornment of the Metropolitan National Church; and read a letter addressed to the Lord Mayor, by Mr. Francis Fuller, of Cornhill, to the effect that, if 400 gentlemen could be found to charge themselves with the responsibility of collecting £100 each, the sum of £40,000 could be easily raised within the next two years, and he should be willing to be one of the 400; or, if preferred, he should be willing to be one of forty, who should in that case charge themselves with the responsibility of collecting £1,000 each within the same time. The consideration of Mr. Fuller's proposition was eventually adjourned. The Lord Mayor said the Dean and Chapter did not share in the increased value of the Cathedral property which had accrued by lapse of time. Of that the Ecclesiastical Commissioners had the advantage.

Wedgwood Institute at Burslem.—The competition designs for ornamenting this Institute are now being exhibited at the South Kensington Museum, in the iron building near to the works sent in competition for the Art Workmanship prizes of the Society of Arts.

Manufactures.

Dangerous Oil Lamps.—The recent destruction of the vessel *Lotty Sleigh*, in the Mersey, by an explosion of gunpowder originating in an accident with a petroleum lamp, has forcibly directed the attention of the public to the frequency of these accidents, and the question is being constantly raised as to whether or not lamps burning mineral or hydro-carbon oils can be used with safety. The *Ironmonger* states that "these accidents have arisen from the employment of badly rectified and consequently dangerous oils. An oil that requires to be heated to 120° before it can be set on fire, may be regarded as practically safe. Of course it is very desirable that its inflaming point should be several degrees higher, as in proportion as the point rises so does the oil become more and more safe. It may be asked, why do not the manufacturers issue oils from which the lighter spirit has been removed by careful rectification. The answer is easy, the lighter spirits are not as valuable commercially as the burning oil, consequently there is a larger amount of profit if they are permitted to remain, and there is a possibility of supplying the retailer at a lower price. Hence it is to the desire of the consumer for a cheap oil, to that of the retailer for a larger profit, and the aim of the manufacturer to make cheaply, so as to sell cheaply, that all these accidents may be attributed. Let it not be imagined that the manufacturers are always to blame. In one fatal case that came under our notice the dangerous character of the oil was due to the retailer, who bought a quantity of light spirit at a reduction of 5d. per gallon on the price of safe burning oil, and mixed the two together so as to get an increased profit on the sale. The recklessness with which the lighter spirits are used is really a matter of astonishment. An accident occurred recently to a servant girl in the Brixton-road; we obtained a sample of the so-called pyrogen, and found that it ignited readily at the ordinary temperature of the atmosphere—giving off an inflammable vapour that could be ignited several inches from the surface of the oil, at 54° Fahrenheit. The oil that caused the fatal accident at Oxenhope, where three persons were destroyed, ignited at 98°, and in no case have we been able to trace any accident to an oil requiring as high a temperature as 120° for its ignition. The remedy for these accidents is in the hands of the consumers. There is an abundant supply of perfectly safe oils in the market, both paraffin and petroleum; and if buyers would refuse to purchase an oil, the igniting point of which is under 125°, there would be no more fatal events of this kind. The Petroleum Act requires that premises where more than 30 gallons of petroleum or any product thereof are stored should be approved and licensed. It does not apply to coal-tar, naphtha, benzine, spirit of turpentine, and other equally dangerous and explosive liquids. Nor does it prevent any vendor selling an oil or naphtha, however dangerous, and without any caution as to its character, provided he takes care never to have a stock exceeding 39 gallons on his premises."

The Patent Law.—Mr. Bright, M.P., in his recent speech before the Birmingham Chamber of Commerce, said: "I understand that at Liverpool there are some influential persons who think that patents ought to be altogether abolished, and that inventors should be remunerated out of a fund to be awarded to them in some way by the Government, and that, if possible, it would be desirable to have an international fund provided by the various countries of Europe and by America, out of which they should receive a fitting compensation. On the face of it this proposition looks extremely reasonable, but I believe its carrying out would be impracticable, and that it would be impossible to make any equal adjudication, because it is often many years before anybody can tell whether a patent has really been valuable, and whether the public have gained much from it or not. I am not very much alarmed at the prospect of the total abolition of patents, and I am not sure, after my experience, which, I am sorry to say, has been considerable, that the public would lose anything by the abolition; and, looking at all that is won and lost by inventions among inventors, I am not certain that inventors would be the losers if there were no patents at all. I believe that not one in twenty of them makes his expenses, and that a good many out of twenty are nearly ruined. There is nothing to prevent the production of useful inventions; the fame attaching to them would be quite a sufficient stimulus with many men to exert their talents in that direction; but, leaving that point, there is the question of the existing law, and no man can have paid great attention to the present law, or rather no law, because, in point of fact, there is no law,—no man can have examined that law without feeling that there is ample room for extensive alteration and amendment. In my opinion, patents are granted in many cases for very insignificant things, and they are nothing but a nuisance to the trade with which they are connected. Frequently the improvements are so trifling, almost so childish, that it is quite absurd to give a man a monopoly which may be the cause of harassing every extensive manufacturing operation. To my mind it would be a great improvement if there were some previous examination of inventions, for the purpose of ascertaining whether the invention is worth a patent, and, if it is not, the patent ought to be refused. In addition to the drawings that are necessary, an exact model of the invention ought to be furnished, so that you might ascertain the exact invention for which the patent was granted. I believe that the plan of models has been adopted in the United States. I do not know much of their law generally, but I believe that to be the case. I think the present system of drawing specifications to be a system of fraud to a very large extent. A man attempts to conceal his invention rather than to explain it, and the wording is so vague that when a conflict arises with some one who he supposes has infringed his patent, he dare not tell you what he claims, and his counsel will fight for days to avoid telling you what the inventor claims and what he has invented, and if it is said, 'This is old,' he says, 'I do not claim that, that is not in my specification;' but if you have not proved it to be old, he will say, 'That is exactly what I do claim.' You are placed in a maze of difficulties, and may go on litigating for years, and it is difficult to say whether you are more near ruin when you have lost than when you have gained your cause. The present law is, in my opinion, so scandalous that it would be better to have none at all. There are multitudes of cases which it is impossible to try in our ordinary courts of justice, and if men could only put aside their wish to conquer, they would find it much easier to toss up for the purpose of ascertaining whether the patent is good, or whether the alleged infringement is an infringement or not. In 99 cases out of every 100 the decision would be as if a long litigation had taken place, and more money would be saved by avoiding the costs than the whole of the patent is worth. I have been, and am now, the victim of this law. Oliver Cromwell, when describing the law in his time, said that it was a 'tortuous ungodly jungle;' and I may say with regard to our patent law that it is a disgrace to any civilized country."

Substitute for Felt.—An improved drying fabric for use in paper-making has been invented. It consists in the substituting of a peculiar kind of cloth, composed of many threads and webs all bound together in the weaving and forming one cloth, for the ordinary felt now in use.

Paper-making Machinery.—An American invention has recently been patented in this country, consisting principally in the arrangement of two or more cylinders moved so as to deliver their webs of paper one upon another, for being pressed together to form boards of any required thickness, and apparatus for drying and calendering such board in the continuous length, previously to cutting into sheets, by which the board is made ready for the market in one continuous operation, the object being to economise room, save labour, and prevent waste of the stuff. There is a new system of troughs and spouts, connected with pipes and valves for regulating the supply of stuff to the machines, and a peculiar arrangement of the press rolls and cylinders for drying and calendering either boards or paper, and the combination of new cutting apparatus, and a piling table.

Commerce.

Coffee.—The amount of coffee retained for home consumption in the United Kingdom was, for the year 1862, 34,451,766 lbs. It appears that the largest quantity retained for consumption in any one of the fourteen previous years was 37,350,924 lbs., in 1854, and the smallest 31,166,358 lbs., in 1850.

Sugar.—There were retained for home consumption in the United Kingdom in the year 1862, of raw sugar, 9,111,879 cwts., of which 4,651,762 were from British possessions, and 4,460,117 foreign; a total quantity larger than in any of the previous fourteen years.

Tea.—The quantity of tea imported into and retained for home consumption in the United Kingdom for the year 1862, was 78,793,978 lbs., being a larger quantity than in any one of the preceding fourteen years; the quantity in 1848 was only 48,734,789 lbs.

Timber.—The total quantity of timber, not sawn or split, imported into and retained for home consumption in the United Kingdom, in the year 1862, was 1,303,208 loads, exceeding the quantity in any one year of the previous fourteen. The smallest quantity imported in any one year of that period was 842,877 loads, in the year 1849.

Tobacco.—Of manufactured tabacco, cigars, and snuff there was retained for home consumption in 1862, 331,544lbs., whilst of unmanufactured tobacco 35,093,444 lbs. were admitted for home consumption, a larger quantity than in any previous year.

Spirits.—The quantities of foreign spirit retained for home consumption in the United Kingdom for the year 1862, were—rum, 3,319,579 gallons; brandy, 1,698,426 gallons; and of other foreign and colonial spirits, 175,324 gallons.

Methylated Spirits.—The quantity methylated in 1862 was 632,225 gals.; in 1863, 748,164 gals. The Commissioners of Inland Revenue, in their report, observe: "It is scarcely too much to say that if this mixture had not been devised for the relief of our manufacturers it would have been almost impossible to maintain the present high rate of duty. Illicit distillation must have been largely developed in all our great cities, which are now (in England and Scotland at least) very little infected by it the unscrupulous traders would have been the customers of the smuggler, thereby injuring both the licensed distiller and their more honest rivals in trade; and those who carried on their business by the use of the legal material only, would have been so burdened by the duty as to compete at a grievous disadvantage with the foreigner. Hence would have arisen a clamour against a tax fraught with so many evils, which it would have been difficult to resist. It is not surprising, therefore, that we regard with unusual anxiety any attempts to neutralize the beneficial effects of this invention by the purification of the mixture so as to render it potable. Hitherto no such attempts—and several have been made—have proved successful. Indeed they have only served to confirm us in the belief that we have nothing to fear on that score. It is true that some aproach to purification may be obtained, but then it is by a process so expensive and so laborious that no one in his senses would resort to it instead of making the spirit at once from molasses, an operation which, while it is in no respect more illegal and dangerous, is infinitely less expensive and protracted."

Beet Root Spirit.—The experiments in this direction in this country do not offer much prospect of success. The distilleries have now dwindled to two. One of these has worked only five weeks this season, producing 1817 gallons of spirits from 139¼ tons of roots, being an average of 13 gallons per ton. The proprietor of this distillery has since left his farm, and sought to transfer his license to his tenant, who was formerly his labourer; but as the licenses were originally granted only to persons of responsibility, and for the purpose of experiment, the Commissioners of Inland Revenue have not thought proper to allow the transfer. The other distillery has been at work during 19 weeks. The work has been carried on slowly this season, and the produce has been on the average about the same for each ton of roots as at the other distillery. The quality of the spirit is still such that it is almost wholly used for methylation.

Exportation of British Spirits.—It appears that there has been a considerable increase in the exportation of British spirits, compensating the distillers in some degree for the deficiencies in the demand for the home market. There appears, by the returns for the year 1863, to be a very large increase in the exportation to the west coast of Africa and to Turkey; indeed it may be said that a new trade has been created in the latter country. This, it is believed, is owing to the war in America, which has stopped the supplies hitherto drawn from that country. There is also a large increase in the trade with Italy, probably connected with the attention which has lately been directed to the manufacture of wine in Piedmont and Tuscany, as an article of commerce. The total quantity of British spirits exported in 1863 was 4,410,948 gals., as against 3,926,242 in 1862.

The Ivory Trade.—At the close of the last century England did not work more than 192,600lb. of ivory per annum; in 1827 the demand had risen to 364,784lb., which supposes the death of 3,040 male elephants per annum, yielding 6,080 tusks, averaging 60lb. each. At present England consumes 1,000,000lb. per annum, or upwards of three times the consumption of 1827; and therefore the number of elephants killed for England alone must be 8,333 or thereabouts. About 4,000 men lose their lives annually in the pursuit after ivory. A tusk weighing 70lb. is considered by the trade a first-class one. Cuvier made a list of the largest tusks found up to his time, and the most considerable one registered by him weighed 350lb. At a late sale of tusks in London, the largest, brought over from Bombay and Zanguebar, weighed from 120lb. to 122lb. Those from Angola averaged 69lb.; those from the Cape and Natal, 106lb.; from Lagos and Egypt, 114lb.; and from Gaboon, 91lb. But these are by no means the largest size to be found at present, for elephant hunters now penetrate further inward into Africa, and therefore meet with older animals. A short time ago an American house cut up a tusk which was not less than 9ft. in length and 8in. in diameter, and weighed 800lb. In 1851 the same house sent over to the London Exhibition the largest piece of sawn ivory ever seen; it was 11ft. in length and 1ft. broad. The dearest ivory is that which is used for billiard-balls. There are several kinds of ivory: that which is brought over from the western coast of Africa, except Gaboon, is much less elastic than other sorts, and not so easily brought to perfect whiteness by the working; it is only used for knife-handles. Since the conquest of Algeria by France, the ivory trade has considerably increased in the North of Africa, which receives its supply from the caravans crossing the desert. The hippopotamus also yields ivory, which is much harder and less elastic than that of the elephant, besides being of much smaller dimensions.

Colonies.

Weather at Adelaide.—Last October was almost the coldest and wettest October known at Adelaide.

Mines in Canada.—A Montreal paper states that a short time since a resident in the township of Durham, county Drummond, discovered a rock on his farm which has since turned out to be an extensive and valuable lead mine, clearly discernible throughout the whole extent of a ridge of land reaching from the Grand Trunk Railway to the St. Francis River, near the village of Ulverton. The copper displays itself in the Lyster-hill Mine, four or five regular veins running parallel to each other, varying from four to eight inches in width, estimated to possess at least 30 per cent. of copper, interspersed with seams of beautiful blue, purple, red, and grey ore, considered to possess from 60 to 70 per cent. of copper. The rock also contains innumerable irregular veins, and indicates in every direction the peculiar green stain, showing an abundant existence of the metal. Shafts are now being sunk with the most encouraging results. Such is the richness of the ore on and near the surface, that an offer was made to the owner of the Lyster-hill Mine to sink a shaft some thirty feet in depth for the mere ore taken out in the excavation. The managers of the Monk Mine, in sinking a shaft in order to reach a vein of copper, have struck an exceedingly rich vein of lead abounding in native silver.

Whaling.—Twenty-four of the Arctic fleet of whalers have arrived at Honolulu, averaging each 1,100 barrels of oil and 400,000lbs. of bone. Whales were very abundant during the season.

The Dutch Colonies.—At the end of next June the annual meeting of the Congress of Rural Economy will be held at Häerlem. Among other subjects to be brought under discussion are the application of steam ploughing to colonial agriculture; the influence to be expected from the railways in Java; the importance of cotton cultivation under the present high prices; the necessity for manuring the sugar plantations; the superior properties of the black variety of sugar cane; the importance of the cultivation of indigo; and an investigation of the reasons why the export of the produce of the *Klapperboom* is not made more available and productive in Java and elsewhere.

Jamaica.—A notice of motion has been given in the House of Assembly: "That an address be presented to the Lieutenant-Governor, praying for a grant of £300 in aid of agricultural and horticultural prizes and exhibitions; also for prizes for the more successful and the more economical cultivation of sugar, cotton, chinchona, cassava, honey, wax, tobacco, and other minor products. This sum to be appropriated and paid by the Governor to such society or societies as may be established in furtherance of these objects." The cultivation of chinchona is still engaging public attention. The House of Assembly has ordered the distribution of such plants as have been raised, so that there might be a fair trial given the experiment. The traction engine has been introduced into Jamaica, and two of these engines, manufactured to order, are now employed in the transit of produce from the estates to Kingston. Cotton cultivation is steadily extending among the small free-holders in Berbice, and the success of the Hon. L. Porter at Enmore, has stimulated, it seems, other proprietors of estates to try their hand in the same direction.

New Zealand Flax.—A firm has been established at Christchurch, in New Zealand, for manufacturing paper out of the *Phormium tenax*. Branch firms are to be established in every province. It is anticipated that before long paper-making will be a staple trade of New Zealand.

The Kangaroo in Australia.—A Sydney paper states that from some cause or other, the kangaroos have of late greatly increased. In some neighbourhoods they are now so plentiful that with some families their flesh forms a staple article of diet. They are now actually becoming a nuisance in one district, and it is becoming apparent that some system of wholesale destruction will have to be devised for checking their rapid increase, as they threaten soon to overrun the district.

Forthcoming Publications.

A Series of Metric Tables, in which the British standard weights and measures are compared with the metric weights and measures at present in use on the Continent, by C. Hutton Dowling, civil engineer, are announced by *Messrs. Lockwood and Co.*, as to be published at Easter, in demy 8vo, price 10s. 6d. It is thought that such a series of tables for facilitating the ready conversion of metric measures and weights into those of the British standard, and *vice versâ*, will render important service to all engaged in manufacturing, mechanical, or commercial transactions with countries which have adopted the metrical system. These tables were in part originally calculated by the author for his professional use; so great, however, has been the benefit derived from them, that he has been induced to extend them, so as to form a complete collection suitable to all branches of foreign commerce. A Synoptic Table of the Measures and Weights of the Metric System, illustrated with diagrams drawn to the natural scale, by the same author, is also preparing for publication, by *Messrs. W. and A. K. Johnston*, Edinburgh. The size is 65 by 51 inches.

Notes.

Revenue and Expenditure.—The estimated gross revenue for the year ending March 31st, 1863, was £70,050,000; the actual receipt at the Exchequer was £70,603,561, shewing a surplus of £553,561. For the same period the estimated expenditure was £70,040,000; the actual expenditure £69,302,008. This amount is exclusive of the expenditure for fortifications, which was provided for by the creation of annuities and not estimated in the budget.

Taxes.—There were repealed or reduced from the years 1848 to 1862, taxes to the amount of £31,091,467, whilst only £26,947,296 were imposed.

Imports and Exports.—The real value of the total exports of merchandise from the United Kingdom was increased from £115,821,092 in 1854, to £167,189,398 in 1862, whilst the real value of the total imports into the United Kingdom has increased during the same period from £152,389,053 to £226,592,729.

Bernard Palissy.—It is proposed to erect a statue to this famous worker in pottery, at Saintes (Charente-Inférieure), his birthplace.

Education in France.—The *Débats* says that the situation of France as to primary instruction may be summed up as follows:—The number of schools is 82,135, or 16,156 more than in 1848. The scholastic population is 4,732,000, instead of 3,772,000, which shows an increase of nearly a million. The girls' schools form but little less than a third of the totality, or 26,592; the number of pupils in these latter is in a rather larger proportion; that is to say, 1,669,000, or 34 per cent. more. There are besides a certain number of girls who frequent the mixed schools. The infant asylums contain 345,000 children of both sexes. A rivalry has, as is well known, arisen between lay teaching and that of the religious congregations. The *Livre Bleu* gives some details on this subject; the 36,499 communes provided with means of instruction contain 41,426 public free schools, for boys only, or for both sexes. Of this number 37,895, containing 2,145,000 pupils, are directed by laymen, and 3,531, comprising 482,000 scholars, have clerical masters. The teaching in the girls' schools is much more in the hands of the religious congregations than that in the boys, the number of schools being almost equally divided between the lay female teachers and the religious establishments. The quality appears to be superior on the side of the lay teaching, for all the mistresses of that order have received certificates of capacity.

The International Exhibition Building.—The scaffolding under the eastern dome of the International Exhibition building is completed, and the visible taking down of this large framework has commenced. On the 22nd ult., the gold ball and finial, which for the space of two years have overlooked the metropolis, were lowered to the ground by means of ropes and pulleys, and, in spite of the high winds, without accident. On the best authority it is stated that the entire dome will be taken down and removed to Muswell Hill within six weeks. The re-erection of those parts of the building which have been removed, has already been commenced in the Alexandra-park, under the immediate superintendence of Mr. Johnson, the architect, and Mr. Meesom, the engineer. The design for the new building is light and elegant, and appears well suited for the purposes for which it is intended.

The Pneumatic Despatch.—The report of the directors of this company states that various difficulties and delays have arisen from the combined opposition of tenants on the Bedford estate, and that, to avoid a protracted litigation, the main works from Euston-square to the City are being carried by the more circuitous route of Tottenham-court-road, about 800 feet of tube having been already laid down. Other portions of the line are being commenced. The Commissioners of Sewers wish the company to re-consider their route between Fleet-valley and the Post Office, suggesting the desirability of carrying the tube through the grounds of Christ's Hospital, to avoid the obstruction of the traffic in Newgate-street. About 4500 trains have been regularly despatched through the tube during the past half-year from Euston Station to the district post-office in Eversholt-street.

Statue to Rossini.—The Marquis Salamanca and the Chevalier Delahante, in the name of the Society of Roman Railways, have presented to the town of Pesaro a magnificent statue in bronze of Rossini, designed and manufactured by Marochetti. The inauguration of the statue will probably take place on the 29th of February, the anniversary of his birth, when he will attain his 72nd year.

Proposed International Exhibition at Vienna.—It is stated, on good authority, that this exhibition is abandoned for 1866, and proposed to be held in 1870.

Wedgwood Institute, Burslem.—At the first meeting of the Working Men's Committee, on the 26th of January, Mr. Enoch Bourne, from Longport Pottery, was appointed secretary to the committee. The representatives from several manufactories reported satisfactory progress of the working men's subscriptions. From the Hill Pottery £72 was promised, though the canvass was still incomplete. A meeting at Messrs. Elliot and Son's works had unanimously resolved that a day's wages, at least, should be contributed. Progress had been made at Messrs. Davenport and Co.'s works, and the workpeople of Mr. Beech, at the Bell

Works, had determined to contribute—in addition to the amount they had already paid in—a penny in the pound on their weekly earnings until the Memorial Building is completed.

Correspondence.

New Inventions.—Sir,—Two or three projects have been much noticed in the papers of late, which are by no means new inventions. The first is a proposal, by a Frenchman, to add a certain combination of springs to wheel carriages of all descriptions, in order that the very load they carry shall help to drive them on after being once put in motion; an idea without any foundation, as is well known to all mechanicians. I once knew a mechanical genius who had a wheelbarrow constructed with a complicated spring wheel, which he confidently asserted would not only go on of itself when once put in motion, but that it would pull on the man who held the handles. After it was completed and tried, he was glad to have his self-acting springs knocked off, and allow the machine to be turned into a common wheelbarrow. Another project is the old one of perpetual motion by means of a wheel with heavy weights constantly standing out further from the axle on one side than the other. This perpetual motion, as it is called, is accurately described in his "Century of Inventions," by the Marquis of Worcester, and, unlike many of his magnificent foresights, is of course entirely visionary. The centres of gravity of the weights on each side of the wheel are both at exactly the same distance from the axis in all positions, and the wheel is consequently as immovable as a rock. The last I shall refer to is the double-ironed skate, which is a mistake altogether, for unless both the irons bear on the ice, the support of the weight of the body is thrown out from the centre of the foot, and therefore will occasion a greater strain upon the ankle than the common single-ironed skate.—I am, &c., Henry W. Reveley.

Reading.

MEETINGS FOR THE ENSUING WEEK.

Mon. ...R. Geographical, 8½. 1. Dr. Haast, "Mountains and Glaciers of Canterbury Province, New Zealand." 2. Don Antonio Raimondy, "On the Frontier Province of Loreto, in Northern Peru."
Medical, 8½. Dr. Gibb, "On Subglottic Œdema of the Larynx."

Tues. ...Med. and Chirurgical, 8½.
Civil Engineers, 8. Renewed Discussion upon Mr. Redman's paper on "The East Coast, between the Thames and the Wash Estuaries."
Syro-Egyptian, 7½. Mr. W. F. Ainsworth, "On the Site of Capernaum, or Caphar Nahum."
Ethnological, 8. 1. Mr. Augustus Oldfield, "On the Ethnology of Australia."
Royal Inst., 3. Prof. Tyndall, F.R.S., "On Experimental Optics."

Wed. ...Society of Arts, 8. Mr. J. Beavington Atkinson, "On Fresco-Painting as a suitable mode of Mural Decoration."
Graphic, 8.
Microscopical, 8. Annual Meeting.
Literary Fund, 3.
Archæological Assoc., 8½. 1. Mr. Wentworth, "On Heath Old Hall." 2. Mr. Hopper, "On an Inventory of a Yorkshire Chapman." 3. Mr. Baigent, "On the Discovery of a Roman Leaden Coffin at Bishopstoke."

Thur. ...Royal, 8½.
Antiquaries, 8.
R. Society Club, 6.
Royal Inst., 3. Prof. Tyndall, F.R.S., "On Experimental Optics."

Fri. ......Astronomical, 3. Annual Meeting.
Royal Inst., 8. Prof. Wanklyn, "On the Synthesis of Organic Bodies."

Sat. ...R. Botanic, 3¾.
Royal Inst., 3. Prof. Frankland, "On the Metallic Elements."

Patents.

From Commissioners of Patents Journal, January 29th.

Grants of Provisional Protection.

China, &c., packing for firing—74—S. Woolf.
Coffee urns—46—G. Mead.
Engines—96—T. English.
Fibrous material—80—W. Clark.
Fire-arms, breech-loading—50—R. Adams.
Guns, &c.—85—G. Ash.
Guns, breech-loading—94—G. Wilkins.
Hoops, rails, &c., cast steel—48—J. Ramsbottom.
Horse shoes—64—J. Coppard.
Iron ores, smelting—58—B. Samuelson.
Mines, preventing accidents in—100—W. Denton and J. Whitaker.
Motion, communicating—52—A. J. S. Graham.
Motive power—44—A. M. Basset and L. N. D. Lamoroux.
Motive-power engines—78—J. Lane.
Paper, drying—56—P. McLaurin.
Pontoons—68—W. H. Barlow.
Railway tarpaulins, &c., rendering non-combustible, &c.—66—J. Gibbins.
Railways, removing obstructions on—3299—M. C. E. Houdayer and J. J. Cormier.
Roller blinds—62—J. P. Culver and R. B. Jarvis.
Safety lamps—54—J. Rees.
Scarfs—70—J. S. Jarvis.
Ships, sheathing—88—C. Askew.
Shirts—92—P. McIntyre.
Soap—10—J. L. P. Duroy.
Steam boilers—86—L. E. C. Martin.
Steam engines—18—W. Hall.
Steam engines—76—J. Coates.
Targets—98—J. F. Bland.
Telegraphic apparatus—72—H. A. Bonneville.
Water wheels—82—W. E. Newton.
Weaving—84—C. Little.

Inventions with Complete Specifications Filed.

Ships, steering—193—E. Myers.
Ships, recovering—204—H. A. Bonneville.

Patents Sealed.

1901. W. Cotton.
1902. R. A. Brooman.
1904. G. Taylor.
1919. J. Abrahams.
1921. G. Stevens.
2000. J. Edmunds.
2171. G. Alcan.
2827. B. Marriott and C. Radcliff

From Commissioners of Patents Journal, February 2nd.

Patents Sealed.

1929. G. Clark.
1933. W. Hodson.
1937. J. E. Dowson.
1939. W. P. Hodgson and J. V. Woodifield.
1940. J. Fenwick.
1941. J. Young.
1944. G. E. Charageat.
1945. E. E. Quelle.
1946. J. Kirkham.
1947. T. Simmelkiar.
1949. W. Jones.
1952. J. W. Slater.
1953. J. H. Johnson.
1954. R. A. Brooman.
1959. J. Thompson, E. G. Fitton, and F. A. Fitton.
1960. N. Jarvie and W. Miller.
1964. H. R. Brown.
1966. J. W. Armstrong.
1967. J. A. Fullarton.
1979. W. B. Haigh.
1983. J. Wheeler.
2012. E. B. Wilson.
2016. N. S. Russell.
2066. W. Galloway and J. Galloway.
2068. W. Hamilton.

Patents on which the Stamp Duty of £50 has been Paid.

212. J. H. Johnson.
244. A. Boyle.
248. G. T. Bousfield.
250. G. T. Bousfield.
251. G. T. Bousfield.
219. C. De Bergue.
289. J. Abraham.
228. J. A. Shipton.
230. W. Winstanley and J. Kelly, W. Payne and J. Formby.
246. E. Smith.
275. H. Bessemer.
279. W. Prangley.
291. R. Howarth.
301. J. Leeming.
249. H. Phillips and J. Bennehr.
263. J. Chatterton.
286. J. G. Marshall.
259. A. Crichton.

Patents on which the Stamp Duty of £100 has been Paid.

278. I. Holden.
279. I. Holden.
380. I. Holden.
281. I. Holden.
491. H. Y. D. Scott.
241. D. Y. Stewart.
267. W. Weild.
285. J. A. Williams.

Registered Designs.

Le jupon Diane—4615—Jan. 21—G. Royle and J. Mills, 32, King-street, Cheapside.
Wrapper for newspapers, periodicals, &c.—4616—Jan. 26—Julius Wittenberg, 12, Clarendon-road, Notting-hill.
A harrow tine—4617—Jan. 29—Plenty and Pain, Eagle Iron Works, Newbury, Berks.
Reliable safety anchor—4618—Jan. 30—E. R. C. Morgan, The Mumbles, near Swansea.